ſtantiam duorum digitorum, & inde demittebatur; ita ut toto ſuo deſcenſu deſcriberet arcum duorum digitorum, totaque oſcillatione prima, ex deſcenſu & aſcenſu ſubſequente compoſita, arcum digitorum fere quatuor: idem oſcillationibus 164 amiſit octavam motus ſui partem, ſic ut ultimo ſuo aſcenſu deſcriberet arcum digiti unius cum tribus partibus quartis digiti. Si primo deſcenſu deſcripſit arcum digitorum quatuor, amiſit octavam motus partem oſcillationibus 121; ita ut aſcenſu ultimo deſcriberet arcum digitorum $3\frac{1}{2}$. Si primo deſcenſu deſcripſit arcum digitorum octo, ſexdecim, triginta duorum vel ſexaginta quatuor, amiſit octavam motus partem oſcillationibus 69, $35\frac{1}{2}$, $18\frac{1}{2}$, $9\frac{2}{3}$ reſpective. Igitur differentia inter arcus deſcenſu primo & aſcenſu ultimo deſcriptos, erat in caſu primo, ſecundo, tertio, quarto, quinto, ſexto, digitorum $\frac{1}{4}$, $\frac{1}{2}$, 1, 2, 4, 8 reſpective. Dividantur eæ differentiæ per numerum oſcillationum in caſu unoquoque; & in oſcillatione una mediocri, qua arcus digitorum $3\frac{3}{4}$ $7\frac{1}{2}$, 15, 30, 60, 120 deſcriptus fuit, differentia arcuum deſcenſu & ſubſequente aſcenſu deſcriptorum, erit $\frac{1}{656}$, $\frac{1}{242}$, $\frac{1}{69}$, $\frac{4}{71}$, $\frac{8}{37}$, $\frac{24}{29}$ partes digiti reſpective. Hæ autem in majoribus oſcillationibus ſunt in duplicata ratione arcuum deſcriptorum quam proxime; in minoribus vero paulo majores quam in ea ratione, & propterea (per Corol. 2. Prop. xxxi. Libri hujus) reſiſtentia Globi, ubi celerius movetur, eſt in duplicata ratione velocitatis quamproxime; ubi tardius, paulo major quam in ea ratione: omnino ut in Corollariis Propoſitionis xxxii. demonſtratum eſt.

Deſignet jam V velocitatem maximam in oſcillatione quavis, ſintque A, B, C quantitates datæ, & fingamus quod differentia arcuum ſit $AV+BV^{\frac{3}{2}}+CV$. Et cum velocitates maximæ in prædictis ſex Caſibus, ſint ut arcuum dimidiorum $1\frac{7}{8}$, $3\frac{3}{4}$, $7\frac{1}{2}$, 15, 30, 60 chordæ, atque adeo ut arcus ipſi quamproxime, hoc eſt ut numeri $\frac{1}{2}$, 1, 2, 4, 8, 16: ſcribamus in Caſu ſecundo quarto & ſexto numeros 1, 4, & 16 pro V; & prodibit arcuum differentia $\frac{1}{242}$ æqualis $A+B+C$ in Caſu ſecundo; & $\frac{2}{35\frac{1}{2}}$ æqualis $4A+8B+16C$ in

caſu quarto; & $\frac{8}{9\frac{2}{3}}$ æqualis $16A+64B+256C$ in caſu ſexto. Unde ſi per has æquationes determinemus quantitates A, B, C; habebimus Regulam inveniendi differentiam arcuum pro velocitate quacunque data.

Cæterum cum velocitates maximæ ſint in Cycloide ut arcus oſcillando deſcripti, in circulo vero ut ſemiſſium arcuum illorum chordæ, adeoque paribus arcubus majores ſint in Cycloide quam in circulo, in ratione ſemiſſium arcuum ad eorundem chordas; tempora autem in circulo ſint majora quam in Cycloide in velocitatis ratione reciproca: ut ex reſiſtentia in circulo inveniatur reſiſtentia in Trochoide, debebit reſiſtentia augeri in duplicata circiter ratione arcus ad chordam, ob velocitatem in ratione illa ſimplici auctam; & diminui in ratione chordæ ad arcum, ob tempus (ſeu durationem reſiſtentiæ qua arcuum differentia prædicta generatur) diminutum in eadem ratione: id eſt (ſi rationes conjungamus) debebit reſiſtentia augeri in ratione arcus ad chordam circiter. Hæc ratio in caſu ſecundo eſt 6283 ad 6279, in quarto 12566 ad 12533, in ſexto 25132 ad 24869. Et inde reſiſtentia $\frac{1}{242}$, $\frac{2}{35\frac{1}{2}}$, & $\frac{8}{9\frac{2}{3}}$ evadunt $\frac{6283}{6279 \times 242}$, $\frac{25132}{12533 \times 35\frac{1}{2}}$ & $\frac{201056}{24869 \times 9\frac{2}{3}}$, id eſt in numeris decimalibus 0,004135, 0,056486 & 0,8363. Unde prodeunt æquationes $A+B+C=0,004135$: $4A+8B+16C=0,05648$ & $16A+64B+256C=0,8363$. Et ex his per debitam terminorum collationem & reductionem Analyticam fit $A=0,0002097$, $B=0,0008955$ & $C=0,0030298$. Eſt igitur differentia arcuum ut $0,0002097\,V+0,0008955\,V^{\frac{2}{3}}+0,0030298\,V^2$: & propterea cum per Corol. Prop. xxx. reſiſtentia Globi in medio arcus oſcillando deſcripti, ubi velocitas eſt V, ſit ad ipſius pondus ut $\frac{7}{11}AV+\frac{16}{23}BV^{\frac{3}{2}}+\frac{3}{4}CV^2$ ad longitudinem Penduli; ſi pro A, B & C ſcribantur numeri inventi, fiet reſiſtentia Globi ad ejus pondus, ut $0,0001334\,V+0,0006623\,V^{\frac{3}{2}}+0,0227235\,V^2$ ad longitudinem Penduli inter centrum ſuſpenſionis & Regulam, id eſt ad 121 digitos. Unde cum V in caſu